The Manhattan Project and the Decision to Drop the Bomb

Science and Its Times, 2001
From U.S. History in Context

Overview

The Manhattan Project ushered in the nuclear age, and with it the concept of international relations and war changed forever. Humankind now had the ability not only to destroy nations and civilizations but to end life as we know it on the planet.

Background

During the years immediately following the First World War, Germany became the center for the study of physics. The most important work in the area of atomic energy was carried on in German universities, especially at the University of Berlin. The most important people in the field traveled to Germany to study, teach, and attend symposiums. Among the many scientists who were to have an impact on the study of atomic energy with this German connection was the Danish physicist Niels Bohr (1885-1962), who would create the scientific model of the hydrogen atom. His extensive work in this area was largely based upon the research of the two famous German physicists Albert Einstein (1879-1955) and Max Planck (1858-1947). The Hungarian Leo Szilard (1898-1964) and the Italian Enrico Fermi (1901-1954), who both played an important role in the development of the atomic bomb, spent time in Germany. Robert Oppenheimer (1904-1967), the great American theoretical physicist and leader of the Manhattan Project, and Edward Teller (1908-), the father of the American hydrogen bomb, both studied physics at German universities. Werner Heisenberg (1901-1976), one of the founders of quantum theory and Teller's dissertation advisor, would play a major role in the German bomb program. As political events of the 1920s and 1930s began to unfold, German preeminence in this field would be an important factor in the history of the twentieth century.

In the 1920s, historical forces were changing the international landscape of the world. Totalitarian states of both the left and the right began to have an impact on the nations of Europe and Asia. In 1917, the largest country on the Eurasian landmass, Russia, became the world's first Communist state as a result of the Bolshevik Revolution. This event was based upon the scientific principles of dialectical materialism found in the writings of Karl Marx. Both Lenin and Stalin viewed science and technology as essential to the development of the modern socialist state. The same held true for the emerging Fascist states of Italy and Germany.

Allegiance to the state was seen as the modern secular replacement of the earlier European quest for religious immortality. Leaders and generations would come and go, but the socialist workers' paradise and the thousand-year Reich would last forever. Science and technology would be two of the tools used for the betterment of the state. They would increase and strengthen both economic productivity and the nation's military capacity, thus allowing the new secular ideology to dominate the world. The same model was

present in Japan, which, during the Meiji Restoration, had adopted Western- based science and technology and by the end of the 1920s moved toward a militaristic right-wing government.

The Western democratic industrialized nations such as Britain, France, and the United States had also embraced this new scientific model. However, unlike the totalitarian states, they did not focus much of their attention on weaponry. As a result of the Great Depression, these countries continually chose societal needs in the "guns and butter" debate. Since these states were influenced by political pressure, they had to respond to the pressing needs of a democratically active populous suffering the pain of economic uncertainty. This is not to say that there was an absence of interest in nuclear physics in these nations. Great and important work was done in the Western democracies, especially at Berkeley under the direction of Oppenheimer, but this was theoretical in nature and not aimed at an emerging military industrial complex.

Unfortunately, these great accomplishments in physics did not occur in isolation but coincided with a series of political events that would eventually end with the outbreak of war and the development of the atomic bomb. The first two years of the 1930s saw Western science split the atom and discover the neutron. It was also at this time that the Japanese invaded Manchuria and created the puppet state of Manchukuo. By 1934, the discovery of artificial radioactivity showed that humankind had the potential of creating a new and very powerful source of energy. Radioactivity is the energy produced from the destruction of atomic nuclei in certain elements such as uranium. This was followed in 1936 with the formation of the Rome, Berlin, Tokyo Axis. In 1939, the basic model of atomic fission was constructed, and this was quickly followed by the first chain reaction. A chain reaction is the self-sustaining process of energy release from atomic fission. By the end of the same year many scientists believed that the process of nuclear fission could be used to create the world's most powerful weapon. Any country that had a monopoly on this technology could impose its will upon the entire world. By September of that year Hitler had invaded Poland and the Second World War had begun.

When the war started, the United States had no intention of participating in the conflict. Public opinion was against any involvement in international disputes. This was the result of two decades of an isolationist foreign policy and 10 years of economic depression. Americans were more concerned with pressing problems at home and were concentrating on the programs of Roosevelt's Second New Deal. However, the President knew that the United States could not remain isolationists in the face of a growing Fascist menace, and that it was only a matter of time before we were drawn into the war.

Ironically, America would be the beneficiary of the racist ideology of the Nazi regime. In 1936, Hitler set into motion the racial purity program that he described in detail in *Mien Kampf*. Hitler, through his racist anti-Semitic ideology, used the Jewish people as scapegoats for the economic, social, and political problems facing Germany. Many Jewish intellectuals who were lucky enough to have the ability to leave Germany after 1933 settled in the United States. Among the more notable scientists were Albert Einstein, the most famous German physicist, and two Hungarians, Leo Szilard and Edward Teller, both of whom had studied and taught in Germany. The free and open environment of the United States allowed our nation to "inherit" some of the best minds working in the field of nuclear physics.

In 1939, the Nazis stopped exporting uranium from Germany and Czechoslovakia. This convinced Einstein and his colleagues that Germany in fact was in the process of constructing an atomic bomb. A group of concerned nuclear scientists composed a letter, and Einstein delivered it to President Roosevelt. The communique dealt with four major areas. Roosevelt was informed that Enrico Fermi and Leo Szilard had proved that uranium could be turned into an important power source. He was also notified that it was possible to create a chain reaction that would unleash a considerable amount of energy, and that with this

process a device or bomb could be developed to be used against a military target. The letter also stated that the largest available source of uranium was located in the Belgian Congo and that Roosevelt would be well advised to begin steps to assure Allied control of that area. Finally, the scientists strongly suggested that open lines of communication be established between university professors working on this new technology and the government of the United States.

Impact

Roosevelt and Congress finally agreed on the importance of the situation, and they began to develop a program to investigate the potential of atomic energy. The initial location of the program was in the Manhattan district of the Army Corps of Engineers, and because of this it was designated the Manhattan Project. The first major accomplishment was the signing of the Quebec Agreement in August of 1943. This created broad guidelines for American/British cooperation. Both countries agreed that this new weapon would never be used against each other and that each would notify the other before it was used against an enemy. Guidelines were also created to control the flow of information and to cooperate on research for the peaceful application of this new-found energy source. Finally, an agreement was reached to create a policy board made up of representatives from both countries.

Within a very short period of time an oversight committee was formed to handle the major problems concerned with the construction of the bomb. This group dealt with a number of topics, including research, military applications, control of secret information, the international community, (including the Soviet Union), and the destructive capability of the weapon. The leader of this committee was Secretary of War Henry Stimson. In his opening remarks he emphasized that this program was not just for military purposes. He believed it would provide humankind with a clearer view of the universe and should be compared to the work of Nicolaus Copernicus's (1473-1543) heliocentric theory and Isaac Newton's (1642-1727) universal law of gravity. Most importantly, he believed this new science should be controlled for peaceful means.

The leading scientist and manager of the Manhattan Project, Dr. J. Robert Oppenheimer, believed consensus had to be reached concerning the regulation of fundamental research. The debate revolved around how much academic freedom the scientists should be given. Most of the scientists believed that the research process should be as open as possible with each person working on the project being allowed total access to the work of every other individual doing research in the area. Furthermore, the opportunity to return to the university environment should be accorded to everyone. Oppenheimer believed that a freer mode of inquiry would ultimately accelerate research, which would result in shortening the war. Most of the scientists knew that the basic knowledge related to nuclear energy was widely known throughout the world. Oppenheimer and his colleagues believed that if all the new research were made readily available, emphasis would be placed upon peaceful applications, which in turn would benefit the entire human community. Other scientists argued that the success of recent industrialization was in great part the result of the free exchange of information among Western technologists. It was an accepted fact that modern science and technology was based upon teamwork, and that it was virtually impossible to keep the findings of modern research secret for long periods of time. Government representatives urged caution and proposed the creation of an international committee that would regulate both the free exchange of information and also enforce strict inspection to insure that potential aggressors would not use the knowledge for the benefit of their military.

The Allied nation that created the most concern was the Soviet Union. Since its inception in 1917, the Western democracies regarded it as a major threat to their existence. The United States did not recognize it as a member of the community of nations until 1933, when Franklin Roosevelt opened the first United

States embassy in Moscow. In August 1939, relations hit an all time low when Stalin signed a nonaggression pact with the Nazis. This relieved Hitler from the problem of fighting a two-front war, and during September 1939 the combined forces of Fascist Germany and Communist Russia invaded Poland, beginning the Second World War. According to the agreement, the Soviet Union was also allowed to invade the Baltic nations of Estonia, Lativa, and Lithuania. These events revealed Stalin as a premier political opportunist who was more concerned with personal power than with political philosophy. Much of the petroleum used by the German Luftwaffe to bomb London during the "Blitz" came from Soviet-controlled oil fields in eastern Poland. Ironically, Stalin became "Uncle Joe," our trusted ally in June of 1941, after Hitler betrayed the Soviets and invaded their homeland. It was obvious from the beginning of the relationship that Stalin was untrustworthy and ready to betray any agreement in order to advance his personal agenda.

Oppenheimer again argued that it was virtually impossible to stop the information about the bomb from reaching the Soviet Union. This was a very delicate subject for him to deal with. His wife, younger brother, and mistress had all been active members of the American Communist Party, and on more than one occasion he had given financial aid to the party. Early on in the Manhattan Project he had been approached by a Soviet agent seeking his cooperation. Even though he refused, the specter of treason would follow him for the rest of his career. Secretary of War Stimson did not trust the Russians and believed the only solution was to create a coalition of powerful democratic nations which would force the totalitarian countries to act in a peaceful fashion.

Not long after the project began, extensive work was done on the possible effects of the bomb on a military target. The scientific community warned that the impact would be terrifying. They stated that the device would create a luminous mushroom cloud that would extend to an elevation of between 10,000 and 20,000 ft (3,048-6,096 m). The scientists predicted the explosion would create such a strong neutron effect that it would kill all human life within a radius of two-thirds of a mile.

Most of the important actions of the Manhattan Project were based upon the ultimate goal of shortening the war. This resulted in the decision not to give the target any advanced warning but also not to hit a civilian area if possible. Most of the military men wanted a strategic target, such as a military or naval base or an important war plant. There was also discussion of simultaneous strikes, but this was rejected because the scientists believed the collection of meaningful data would be easier if there were individual detonations. The engineers also cautioned that an attempt to have multiple strikes would reduce quality control and cause a possible disaster.

In the early morning hours of July 16, 1945, near Alamogordo, New Mexico, the first nuclear device, designated Trinity, was detonated. The force of the blast equaled 20,000 tons (18,160,000 kg) of TNT and created a fireball 10,000 times hotter than the Sun. A deadly radioactive mushroom cloud rose 8 mi (12.9 km) into the sky, and at the same time back on Earth a 1,200-foot (366 m) crater was dug out of the surface of the planet. Members of the Manhattan Project, along with important government dignitaries, viewed the explosion from a fortified location approximately 6 mi (9.6 km) from ground zero. Most of the witnesses stood in stunned silence, knowing that humankind had crossed over into a new age, the nuclear age. Everyone present knew that the world had reached the point where it could not only destroy nations and civilizations but all life on Earth. This was stated best by Oppenheimer when he spoke these chilling words from the *Bhagavad-Gita*, "I am become death, the shatterer of worlds."

Almost immediately, a debate began over whether the bomb should be used. Most of the members of the Manhattan Project were now against using the weapon, even if it meant shortening the war. Many scientists believed that dropping the bomb on Japan would ultimately place the country in grave danger because it

would initiate an arms race. Most experts believed that any number of countries would in a relativity short time be capable of constructing a bomb. The knowledge to build such a weapon was now known in great detail by many scientists around the world. Both the French and the Russians had acquired enough information to catch up with the United States in fairly rapid fashion. Not only was it impossible for the United States to control the vital information concerning weapons development, but it was just as impossible to control the strategic materials used to construct the bomb. Everyone knew that the Soviet Union had considerable deposits of uranium, and once they acquired the necessary knowledge they would be able to build a weapon that would rival the ones of the United States.

At the same time, American military analysts were becoming very concerned about the invasion of the Japanese homeland. The war in the Pacific had become a very bloody campaign. A year before Pearl Harbor, Churchill and Roosevelt had decided on a Europe-first strategy. Both leaders agreed that Hitler and his Nazi military machine were the greatest threat facing the Allies. Despite this agreement, the United States was still able to develop a strong and active military campaign in the Pacific Theater, scoring two important naval victories in early 1942, at Coral Sea and Midway. By mid-year, the military decided on the tactical strategy known as "island hopping." The plan was to control a specific number of important islands that would eventually put the Allies in the position to mount an invasion against the Japanese homeland. Locations such as Guadalcanal, Iwo Jima, and Okinawa quickly became part of United States military history. The combat on these islands was always very intense; both the Japanese and the Allies suffered a great number of casualties. Time and again the Japanese soldiers chose death over surrender. As the war progressed, Japan finally resorted to the use of kamikaze tactics. They would take young men, give them very little training, and send them on suicide missions against American ships. They were given just enough fuel to reach their targets. They were then expected to crash their planes loaded with explosives into the American fleet. Military intelligence believed that if the Japanese continued to exhibit this fighting spirit it would cost the Allies a million casualties to invade the Japanese homeland.

President Truman received the news of the successful test at Trinity while he was attending the Potsdam Conference. When Truman informed Stalin that the United States had successfully tested this new super weapon, he reacted as if he knew nothing about the Project. In fact, however, the Soviets had a spy deep within the Manhattan Project, a British theoretical physicist by the name of Klaus Fuchs (1911-1988). The Russians had been conducting research in this area as early as 1941.

Recently much has been written about an extensive Japanese bomb project. There is a growing amount of evidence that suggests that the Japanese had constructed a research facility in Manchuria. The historical record also suggests that their military had plans of attaching small nuclear bombs to the Kamikaze planes and using them against the Allied invasion force.

President Truman faced a monumental decision about whether to use the bomb. His final decision was based upon the overwhelming desire to save American lives and to bring the war to a speedy conclusion. In typical Truman style, he not only made the decision to drop the bomb but also took full responsibility for the action. On his orders, the *Enola Gay* delivered the first atomic bomb on the city of Hiroshima on August 6, 1945. Within an instant 50,000 people were incinerated. Almost 30,000 more would eventually die of radiation sickness and leukemia within a few short months. The head of the Japanese bomb project, Yoshio Nishina, was flown to Hiroshima to inspect the damage. It was his report, along with a second attack on Nagasaki on August 9, that convinced the military government to accept the plan of unconditional surrender. Yoshio Nishina died of leukemia as a result of the radiation poisoning he received during his inspection of Hiroshima. The Japanese government surrendered on September 2, 1945.

- Robert Oppenhiemer looks at mushroom cloud
- Scarred Asian child

Further Readings

Further Reading

Books

- Frank, Richard B. *Downfall: The End of the Imperial Japanese Empire.* New York: Random House, 1999.
- Goodchild, Peter. *Oppenheimer: Shatterer of Worlds.* New York: Fromm International, 1985.
- Macrakis, Kristie. *Surviving the Swastika: Scientific Research in Nazi Germany.* New York: Oxford University Press, 1993.
- Rhodes, Richard. *The Making of the Atomic Bomb.* New York: Simon & Schuster, 1988.
- Wilcox, Robert. K. *Japan's Secret War: Japan's Race Against Time To Build Its Own Atomic Bomb.* New York: Marlowe & Company, 1995.

Source Citation

"The Manhattan Project and the Decision to Drop the Bomb." *Science and Its Times*. Ed. Neil Schlager and Josh Lauer. Vol. 6. Detroit: Gale, 2001. *U.S. History in Context*. Web. 24 Mar. 2015.

URL

http://ic.galegroup.com/ic/uhic/ReferenceDetailsPage/ReferenceDetailsWindow?failOverType=&query=&prodId=UHIC&windowstate=normal&contentModules=&display-query=&mode=view&displayGroupName=Reference&dviSelectedPage=&limiter=&currPage=&disableHighlighting=&displayGroups=&sortBy=&zid=&search_within_results=&p=UHIC%3AWHIC&action=e&catId=&activityType=&scanId=&documentId=GALE%7CCV2643450684&source=Bookmark&u=j084910011&jsid=0719628098ab8e02431ad7b8357850c6

Gale Document Number: GALE|CV2643450684